AN ANALYSIS OF GENDER ACCESS TO UNIVERSITY, SCIENCE, TECHNOLOGY AND MATHEMATICS EDUCATION: A STUDY OF ADMISSION EXERCISES OF USMANU DANFODIYO UNIVERSITY, SOKOTO

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ABSTRACT

The study analyses gender access to university, science, technology and mathematics education (STM) for the 2005/2006 to 2007/2008 sessions admission of Usmanu Danfodiyo University, Sokoto. Content Analysis Research Design Approach (CARDA) was adopted. Four research questions were addressed; from which two hypothesis were tested using Analysis of Variance statistic (ANOVA) with the aid of computer statistical package for the social sciences (SPSS). It was found that wide gender gap exists in terms of both access to University education and STM education. There are equally significant differences in these gender gaps. The government policy on 60:40 ratios for admission in favour of sciences is not being met. So, it was suggested that the factors identified as inhibiting gender access to education could be overcome if the government could improve access for female gender by seriously reinvigorating, emphasizing and strengthening school science

through committed financial provision to address real issues at the primary, secondary and tertiary institutions.

Background of the Study

The education of male and female has been the subject of discussion and research over the years. The United Nations has been at the fore front of efforts to promote the status of women. Several conferences and seminars have been organised in different parts of the world with focus on gender and education. It has been realized that sustainable human development is not possible if half of the human race remain ignorant and marginalised (Okojie, 2001). The United Nations Development Programme (UNDP, 1997) report on human development asserted that the starting point for eradicating poverty is to empower men and women and to ensure their participation in decisions that affect their lives. And that an important strategy for empowering women is to promote their access to education. The Nairobi Forward looking strategies (1985) points to the fact that "education is the basis for the full promotion and improvement of the status of women. It is the basic tool that should be given to women in order to fulfill their roles as full members of the society" (UNDP, 1997).

The world conference on "Education for all" (EFA) held in Jomtien, Thailand in 1991, drew attention to the gender gap in educational opportunity and its consequences for human development. The Beijing platform for action emphasized that investing in formal and non-formal education and training for girls and women has proved to be one of the best means of achieving sustainable development and economic growth (DFID, 1999, 2000).

In Africa, Okojie (2001) reported the existence of gender disparities in education. She asserts that, in general, primary school enrolment rates are higher in the Middle East and Northern Africa as well as in Southern Africa than in sub-Saharan Africa. The sub-Saharan Africa has performed very poorly compared to other regions in Africa with respect to Gross Enrolment ratio at the primary and secondary levels combined; the same is equally true of third-level enrolment (tertiary education). Thus there is a gender gap in enrolment at all levels of education (United Nations, 2000). In Nigeria, the Universal Basic Education (UBE) law was enacted to fast-track attainment of EFA goals. The legislation provides for a 9 year continuous education (6-year primary and 3 - year junior secondary) known as basic education'. The 2005 National School Census (NSC) exercise revealed a net primary enrolment ratio (NER) of 83.71% (male=87.01%, and female = 81.39%).

> *However, there are large geographical and gender disparities between the Southern and Northern regions of Nigeria. Girls NER in some states in the south are as high as 70% while some in the north are as low as 24%. The picture is worse in secondary schools with the female enrolment ratio at 44%. The regional breakdown shows an alarming disparity with girls NER of 60% in the South-West while the North -West shows a dismal 10%.*
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> Source: (NSC, 2005)

UNICEF Nigeria, development partners and the Nigerian Government have been promoting various initiatives on girls' education including the present Girls Education Project (GEP), which is geared towards promoting and enhancing girls' participation in education. The GEP was inspired by an earlier initiative, the African Girls Education Initiative (AGEI) delivered through UNICEF:

> *It was reported that this intervention recorded remarkable progress since its inception in the early 2000. These include a 28% increase in Girls enrolment (access) and an 80% decrease in dropout rates for girls in the intervention schools. Also, the GEP implementation resulted in girls enrolment increase by an average of 73% from 2005. This has resulted in an overall reduction of gender gaps in the GEP focus schools from 44% in 2005 to 31% in 2007. AGEI emanated from the United Nations Girls Education Initiative (UNGEI) and led to the establishment of the Nigerian Girls Education Initiative. The GEP aim to boost girls participation in Education in Northern Nigeria where it is implemented in six states (Bauchi, Sokoto, Jigawa, Katsina, Borno and Niger).*
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> Source: (UNICEF, 2000)

So, does the alarming gender disparity in North -west with female enrolment as low as 10% in the 2005 NSC and the resultant increase in girls enrolment from 2005 as a result of GEP implementation which is yet to reach maturity stage but expected to led to concomitant gender gap decrease in access to university education? Does gender disparity exist as far as access to university education is concerned in the areas of science,

technology and mathematics, despite, the existence of 60:40 ratio for admission in favour of science related disciplines? The aforementioned background motivates the need for this study, having seen that Usmanu Danfodiyo University, Sokoto, has an important role to play in the efforts towards closing the gender gap in education particularly in the North-western region of Nigeria. This is more so, when the six states where the GEP is implemented are catchment areas for the university. More so that, the acquisition of university education could not be underestimated in opening access to female participation in the development of society.

Statement of the Problem

According to the United Nation Girls Education Initiatives (UNGEI, 2008) there are large geographical and gender disparities in access to University, Science, Technology and Mathematics Education between the southern and northern Nigeria. This could be due to underlying socio-cultural factors. Girls net primary enrolment ratio (NER) in some states in the south are as high as 70% while some in the north are as low as 24%. This is worse in secondary schools with the national female enrolment ratio at 44%. The regional breakdown shows an alarming disparity with girls NER of 60% in the south-west while the north-west shows a dismal 10%.

The Girls Education Project (GEP) is the largest DFID/UNICEF partnership in the world with the aim to boosting girls' participation/access to education in Northern Nigeria and it is being implemented in six northern states of Bauchi, Sokoto, Jigawa, Katsina Borno and Niger. It was reported that there is an overall reduction of gender gaps. Therefore, the study attempts to investigates the extent of gender gap in terms of access to university since the six states constitutes catchment areas of the Usmanu Danfodiyo University, Sokoto. It will also find out the extent of the gap in science, technology and mathematics (STM) education disciplines and whether or not there are significant differences in the gaps. This is in consideration of the 60:40 ratio directives by the National Universities Commission (NUC) on admission of candidates in favour of science related disciplines. From the results, the consequences on the north western Nigeria could be discern.

Objectives of the Study

The study is expected to achieve the following objectives:

1. To determine the extent of gender gaps in terms of access to university, science, technology and mathematics education.

2. To determine the significance of the differences in the gender gaps.

Research Questions

The following research questions were addressed in the study.

1. What is the extent of gender gap in terms of access to university education?
2. What is the extent of gender gap in terms of access to STM education in the university?
3. Is there any significant difference in gender access to university education?
4. Is there any significant difference in gender access to STM education in the university?

Hypotheses

Two hypotheses were tested in this study.

Ho 1: There is no significant difference in gender access to university education.

Ho. 2: There is no significant difference in gender access to STM education in the University.

Limitation of the Study

This study is limited to the admission lists of Usmanu Danfodiyo University Sokoto for the years 2005/06, 2006/07 and 2007/08 academic sessions.

Methodology

The methodology employed in this study is content analysis research. This is a technique that enables researchers to study human behaviour in an indirect way, through an analysis of their communications. Textbooks, essays, newspapers, novels, magazines articles, cook books, songs, political speeches, advertisements, pictures and in fact, the contents of virtually any type of communication can be analysed (Jack and Norman, 2000). Therefore, this study analysed the lists of admission placements posted on the data base of Usmanu Danfodiyo University, Sokoto, (Management Information System (MIS)). The admission placements for three sessions (2005/2006, 2006/2007 and 2007/2008) were used. So, the total number of candidates admitted for the three sessions constitutes the population and sample for the study. The overall population based on gender and

gender access to science, technology and mathematics related areas were analysed respectively.

Methods of Data Analysis

Simple percentage method was employed to determine the extent of gender access or gap in terms of the overall placements and placements in science, technology and mathematics education disciplines. However, one-way analysis of variance statistic (ANOVA) was used to test the hypotheses generated. The computer statistical package for social sciences (SPSS) was used to analyse the data.

Findings

The findings for this study are explained and presented in tabular forms below.

Research Question One.

Table 1: Gender gap in the Admission Placements of Usmanu Danfodiyo University, Sokoto. (2005/2006 – 2007/2008)

Sessions	Male	Female	Total	Percentage		
				Male	Female	Total
2005/2006	4139	1298	5437	76.13	23.87	100
2006/2007	2554	837	3391	75.32	24.68	100
2007/2008	2677	814	3491	76.68	23.32	100
Total	9370	2949	12319	76.06	23.94	100

Source: Usmanu Danfodiyo University, Sokoto Management Information Services Unit (UDUS, MIS, 2008)

Table 1 shows that an average of 76.06% of students admitted into the university were male as against an average of 23.94% for female during the period of three sessions under study. This manifested gross under representation and narrowing access of female gender to university education. There is a clear gender gap in terms of access to university education. Over 75% males and less than 25% females are admitted into the university each year.

Research Question Two:

Table 2: Gender gap in the Admission Placements in Science, Technology and Mathematics (STM) Education of Usmanu Danfodiyo University, Sokoto

Sessions	Male Science	Female Science	Total Science	Percentage		
				Male	Female	Total
2005/2006	1628	441	2069	78.69	21.31	100
2006/2007	1351	460	1811	74.60	25.40	100
2007/2008	1100	361	1461	75.29	24.71	100
Total	4079	1262	5341	76.37	23.63	100

Source: Usmanu Danfodiyo University Sokoto, Management of Information Services Unit (UDUS, MIS, 2008)

Table 2 shows that an average of 76.37% and 23.63% students gained access to the university in the areas of STM education were males and females respectively. This indicated a considerable gender gap in terms of access to STM education in the university.

Table 3: Percentage Distribution of Admission Placements for Arts, Social Sciences/Humanities against STM related disciplines.

Sessions	Arts, Social Science and Humanities (ASSH) placements	STM related disciplines placements	Total	Percentage		
				ASSH	STM	Total
2005/2006	3368	2069	5437	61.95	38.05	100
2006/2007	1580	1811	3391	46.59	53.41	100
2007/2008	2030	1461	3491	58.15	41.85	100
Total	6978	5341	12319	56.64	43.36	100

Source: Usmanu Danfodiyo University Sokoto, Management Information Services Unit (UDUS, MIS, 2008)

Table 3 indicated that an average of 56.64% candidates admitted into Usmanu Danfodiyo University, Sokoto were in the areas of Arts, Social Sciences and humanities as against 43.36% admitted in STM related disciplines. This fall short of the 60% recommended by the National Universities Commission (NUC) by 13.28%.

Hypothesis One (Ho_1)

It states that, there is no significant difference in gender access to university education.

Table 4: One-way Analysis of Variance on the difference in gender access to university education for the 2005/2006 session.

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue
Between	1085600	68	15965	5.75	3.982	0.019
Within	91764	1	91764			
Total	1177363	69				

Table 4 shows that Fcal (5.75) is greater than Fcritical value which is 3.982. This means, the hypothesis is rejected. There is significant difference in gender access to university education in the 2005/2006-admission year.

Table 5: One-way Analysis of Variance on the difference in gender access to university education for the 2006/2007-session admission placement.

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue
Between	162438	75	2166	15.08	3.968	0.000
Within	32671	1	32671			
Total	195109	76				

Table 5 shows that Fcal (15.08) is greater than Fcritical (3.968). SO, the hypothesis is rejected. There is significant difference in gender access to university education in the 2006/2007 admission year.

Table 6: One - way Analysis of Variance on the difference in gender access to university education for the 2007/2008 session admission placement.

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue
Between	139427	76	1835	24.25	3.967	0.000
Within	44497	1	44497			
Total	183924	77				

Table 6 shows that Fcal (24.25) is greater than Fcrit (3.967). So, the hypothesis is rejected. There is significant difference in gender access to university education in the 2007/2008-admission year.

Hypothesis Two (Ho_2)

It states that, there is no significant difference in gender access to STM education in the university.

Table 7: One- way Analysis of Variance on the difference in gender access to STM education in the university for the 2005/2006 session admission placement

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue	
Between	36513	36	1014	30.24	4.113	0.000	
Within	30672	1	30672				
Total	67185	37					

Table 7 shows that Fcal (30.24) is greater than Fcrit (4.113). So, the hypothesis is rejected. There is significant difference in gender access to STM education in the university in the 2005/2006-admission year.

Table 8: One -way Analysis of Variance on the difference in gender access to STM education in the university for the 2006/2007-session admission placement.

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue
Between	115703	41	2822	5.94	4.079	0.19
Within	16767	1	16767			
Total	132470	42				

Table 8 above shows that Fcal(5.94) is greater than Fcrit(4.079). So, the hypothesis is rejected. There is significant difference in gender access to STM education in the university for the 2006/2007-admission year.

Table 9: One-way Analysis of Variance on the difference in gender access to STM education in the university for the 2007/2008-session admission placement

Source of variations	Sum of squares	DF	MS	Fcal	Fcrit	Pvalue	
Between	73756	36	2049	7.01	4.113	0.012	
Within	14372	1	14372				
Total	88127	37					

Table 9 shows that Fcal (7.01) is greater than Fcrit (4.113). So, the hypothesis is rejected. There is significant difference in gender access to STM education in the university for the 2007/2008-admission year.

Summary of Findings

The findings of the study for the period of three academic sessions are presented below.

a. There is a wide gender gap in the access to university education (76.06% male and 23.94% female on average) in the admission placements of Usmanu Danfodiyo University, Sokoto in favour of males.
b. There is a wide gender gap in access to STM education in the University (average of 76.37% male and 23.63% female) in the admission placements of Usmanu Danfodiyo University, Sokoto in favour of males.

c. There is a wide gap in the distribution of admission placements between Arts/Social Sciences and Humanities (ASSH) on one hand and STM related areas on the other (average of 56.64% ASSH and 43.36% STM). This is in favour of ASSH rather than the STM areas as directed by the National Universities Commission (NUC).

d. There are significant differences in gender access to STM education in the admission placements of Usmanu Danfodiyo University, Sokoto.

Discussion of Findings

There has been growing concern over gender parity in the world today. In the world Economic Forum's Global Gender Gap Report (WEFGGGR, 2008), which ranks 128 countries according to the size of their gender gaps, the performance of sub-saharan African countries varies greatly. South Africa, ranked 20. However, the region also contains some of the lowest ranking countries in the world, including Zimbabwe (88) and Nigeria (107), hampered by particularly poor performances in the areas of education and health. This study goes on to confirm this gap existing in the University system in Nigeria. This is because an average of 76.06% males was admitted to read various courses in the University as against 23.94% females. This goes on to confirm that the North-west is lagging behind in the provision of University education to its female members.

The same trend in gap or limited access to science, technology and mathematics education related disciplines are observed in this study. On the average, 76.37% males and 23.63%females are reported to have gained access to STM related areas in the University. The gap is equally stupendous at 52.74% against the female gender. The submission by the vice chancellor of Usmanu Danfodiyo University, Sokoto in the 2007/2008, in his convocation speech (Bande, 2008:4) states that "the admission (2007/2008), which was based on the nationally approved ratio of 60:40 in favour of sciences, affirms our resolve to bolster the science and science-related programmes" has been proved otherwise by this study. This is because the percentage distribution of admission placements for Arts, social sciences and humanities (ASSH) against STM related disciplines indicated that 6978 candidates representing 43.36% gained access to the University for STM related areas. This fall short of NUC guidelines quoted by the vice chancellor by 16.64%, this is considerably large. Nevertheless, there are efforts by the university to meet up with the approved ratio through its matriculation science programme and the introduction of degree programmes in medical laboratory and pharmaceutical sciences.

To also confirm how significant the wideness of gaps are, two hypotheses were tested.

These hypotheses indicated that the gender gaps identified in terms of the general access to University education and those of STM education related areas are significant. So, does it mean that the gap in access to University and STM education in the University are still a function of the factors influencing girls access to education in Africa as indicated in the findings of Academy of Sciences research programme? These factors include, household/family factors; individual/personal factors; community factors; school factors and cultural factors. (Okojie, 2001).

However, if these factors are inferred to be responsible for these gaps, then, what would Usmanu Danfodiyo University do to bolster the rate of female access to University and STM education as a citadel of learning situated in the North western Nigeria? What concrete arrangement would government embark upon to fast track female access to education? And what would individuals and community do to ensure an impressive access of females to the University. All these are in recognition of the fact that Saadia as cited in the world Economic Forum's Global Gender Gap Report of 2008 said "women account for a sizeable portion of Africa's economies and could contribute considerably more if there were greater gender equality". The African gender parity group believes both men and women need to work together to close the gender gap and this better leverage woman talents to increase productivity and prosperity in all of society (WEFGGGR, 2008)

The women would be able to discharge their duties well when they are better educated, that is the reason for the need for an improved access to university education. Nevertheless, the questions raised in this discussion would be addressed in the suggestion.

Conclusion

The conclusion arrived at from the findings of this study is that; there are gender gaps in terms of access to university education and in terms of access to STM education in the university. The government guideline through NUC on 60:40 ratios for admission in favour of sciences has not been met and a lot of factors outside the university could be responsible. The gender gaps in access to university and STM education are quite significant in terms of their differences

Suggestions

- The government could improve access for female gender by seriously reinvigorating, emphasizing and strengthening school science through committed financial provision to address real issues at both the primary, secondary and tertiary institutions, such as Polytechnics, Monotechnics and Colleges of Education, Agriculture and health sciences to enable increase enrolment rate and concomitant increase in academic achievement rate. Doing so would boost the number of candidates that could qualify for admission.
- The concept of supervision of STM Education programmes should be re-introduced, improved, intensified and sustained at all levels; primary, secondary and tertiary.
- Community leaders should be properly enlightened on the importance of STM Education for female gender. To reduce the gender disparity, female gender should be given all the necessary encouragement to pursue STM Education at all levels: primary, secondary and tertiary.

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